REMARKS

Original claims 2-6, 9-33, 36-50, 58-58, 61-66, 68-72, and 75-78, previously amended claims 34, 35, and 59, and currently amended claims 1, 7, 8, 51, 60, 67, 73, and 74 remain in the application.

The Examiner has objected to Abstract of the Disclosure being longer than 150 words in accordance with MPEP § 608.01(b). Applicants have amended the Abstract of the Invention to contain less than 150 words. The Examiner has (a) rejected claim 74 under 35 USC § 112 as being indefinite, and (b) has rejected claims 1-4, 7, 8, 67, 68, 73, and 74 under 35 USC § 102 as being anticipated by U.S. Patent Publication No. US 2003/0112836 A1 (Kim et al.), has rejected claim 9 under 35 USC § 103 as being unpatentable over Kim et al, and has objected to claims 5, 6, 10-50, 69-72, and 75-78 but found same would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening dependent claims, and allowed claims 51-66.

Turning now to the Examiner's rejection of claim 74 under 35 USC § 112 as being indefinite, the Examiner states that "claim 74 includes substeps (c1) and (c2), yet the parent claims already include such substeps, therefore it is not clear how these substeps fit in with the previous claims." Applicants have amended claim 74 to make it dependent on independent claim 73 instead of claim 72 (which is dependent back to independent claim 67) to correct an inadvertent error. More particularly, independent claim 73 recites in step (a) of "generating a light

signal at a desired central wavelength at an input-out of **each of a plurality of n laser sources**" (bold letters used to provide emphasis), and step (c) recites "processing each of the second portions of the output signals from the plurality of n laser sources...". Dependent claim 74 further defines step (c) of claim 73 as "transmitting each of the second portions through a multiplexer/filter..." in step (c1), and steps (c2) and (c3) further define what is done with a multiplexed output signal from the multiplexer/filter. Applicants believe that currently amended claim 74 (as now dependent on independent claim 73) is not indefinite as defined under 35 U.S.C. § 112.

Prior to discussing the Examiner's rejections of the claims 1-4, 7-9, 67, 68, 73, and 74, applicants are providing a brief discussion of the present invention to aid in illustrating the differences between the present invention and the disclosure in U.S. Patent Publication No. US 2003/0112836 A1 (Kim et al.). The present invention is directed to a stabilized laser system that compensates for a shift of a center wavelength of a one or more lasers in a first direction caused by a reflected signal **returned to the output of a laser**. As was shown in present FIG. 2 for the prior art system of FIG. 1, an output signal from a laser 11 in the laser system 10 of FIG. 1 is shifted by a predetermined amount away from a desired central wavelength generated by the laser when a reflected **feedback signal is received at the output of the laser**. Therefore, the output signal from the laser system is no longer found at the desired peak central output wavelength resulting in an insertion loss as is shown in present FIG. 4.

The present invention is directed to a stabilized laser system that comprises a feedback signal generating arrangement that takes a portion of the output signal from at least one laser and generates **a feedback signal to the output of the at least one laser** that is shifted in an opposite direction to the shift away from a desired central wavelength normally generated by the laser **when a reflected feedback is received at the output of the laser.** Accordingly, the output signal from the laser system of the present invention is maintained at a desired central wavelength.

In one aspect the present invention relates to a method for providing a stabilized multiwavelength pump laser system to pump portions of an optical fiber as part of an optical amplifier. Pump lasers are generally found in the form of Fabry Perot (FP) cavity lasers whose multimode spectrums are very broad and extremely sensitive to temperature and laser drive current. Such lasers therefore require wavelength locking and stabilization for most applications such as part of an optical amplifier. Wavelength locking and stabilization is done in the form of a single or multiple optical feedbacks to outputs (front facets) of thee laser sources.

Turning now to the Examiner's rejection of claims 1-4, 7, 8, 67, 68, 73, and 74 under 35 USC § 102 as being anticipated by U.S. Patent Publication No. US 2003/0112836 A1 (Kim et al.). The Examiner directs applicants to FIG. 3 of Kim et al. and states that Kim et al. "discloses a stabilized laser system comprising at least one laser 11, a main transmission filter 12 having first (inputs on the left side) and second (outputs on the right side)

ports, and a feedback transmission filter 14 having first (output on bottom) and second (input on top) ports, the first ports of both filters coupled to the at least one laser (note *direct* coupling is not required), each filter having a different spectral response as a function of wavelength, the second port (right side) of main transmission filter 12 being coupled to the output of the system (far right of the figure), and a feedback arrangement comprising a loop coupled between the second ports of the filters 12 and 14." Applicants traverse the Examiner's rejection of claims 1-4, 7, 8, 67, 68, 73, and 74 under 35 USC § 102 for the following reasons.

Kim et al. discloses a multiwavelength light source locking apparatus and method where (as shown in FIG. 3 and described in the Detailed Description) each of a plurality of n light sources 11 generates a different wavelength output signal (w_x, where x equals one of 1 to n) that is applied to a separate input of a multiplexer 12. The output from the multiplexer 12 is a single wavelength division multiplexed (WDM) output signal comprising the wavelengths w_1-w_n that is applied to a fiber-optic directional coupler 13. A first portion of the WDM received output signal is provided as an output of the apparatus, and a second portion thereof is directed as an input to an Acoustic-optic tunable fiber 14. The tunable fiber 14 also receives a pilot signal at a separate input thereof comprising a plurality of different pilot frequencies f_1-f_n. The output signal from the tunable filter 14 comprises both of each of the separate wavelengths w_1-w_n, and each of separate combined wavelengths of

w_1+f_1 to w_n+f_n that is applied as an input of an wavelength discriminator 17 comprising an optical splitter 15 and an Etalon filter 16 coupled in series. The optical splitter 15 receives the output signal from the tunable fiber 14 and splits it into a first portion that is directed to a first photodetector 18, which generates an electrical output signal indicating a measurement of the intensity of the wavelengths w_1-w_n corresponding to the pilot frequencies of f_1-f_n. The optical splitter 15 further directs a second portion of the input signal from the tunable fiber 14 to a second photodetector 19 via the Etalon filter 16. The second photodetector generates an electrical output signal from said second portion that indicates a measurement of the intensity of each of the different wavelength light beams to the Etalon filter 16. The output signal from each of the first and second photodetectors is provided to and filtered in a plurality of n band-pass filters 22, where each band-pass filter provides a separate electrical signal, indicating a separate intensity of one of the received signal frequencies f_1-f_n, to a corresponding one of a plurality of n wavelength controllers 21. Each wavelength controller 21 compares the two electrical input signals of a corresponding frequency from the first and second photodetectors and generates **a control signal to an input of the corresponding one of the light sources 11** that adjusts the output wavelength of that light source to a desired wavelength. Therefore, if the wavelength of a signal generated by a light source changes, such intensity is measured and a control signal is generated from such measurement and transmitted back to the

input of the light source to adjust its wavelength output signal back to its desired wavelength.

Kim et al. describes a multiwavelength locking method of narrowband transmission laser sources in an optical communication system that includes optical transport networks in which output wavelengths of light sources are monitored and control electrical signals are applied to light sources so as to maintain the output wavelengths of the light sources at fixed predetermined values. This improves wavelength instability of the light sources and may result in an improvement in transmission characteristics.

Kim et al. does not disclose or even suggest a stabilized laser system comprising at least one laser, a main transmission filter and a feedback transmission filter where each transmission filter has first and second ports with the first ports of both transmission filters being coupled to an output of the at least one laser, **each of the transmission filters comprises a different spectral wavelength response as a function of wavelength**, and the second port of the main transmission filter is coupled to an output of the stabilized laser system, and a **feedback arrangement comprising one of a group consisting of a reflector coupled to the second port of the feedback transmission filter, and a loop coupled between the second ports of the main and feedback transmission filters** for generating a feedback signal to the output of the at least one laser as is recited in currently amended independent claim 1. More particularly, with regard to the Examiner's statement that the main and feedback transmission filters of Kim et al. have different spectral responses, the

first (main) transmission filter 12, that the Examiner is referring to, is a multiplexer that only multiplexes a plurality of n wavelength signals into a single WDM output signal. The second (feedback) transmission filter 14 is an Acoustic-optic tunable fiber that merely passes each of the WDM wavelengths from the first transmission filter 12 as they are received concurrently combines each of a plurality of n pilot signal input signals f_1-f_n with a corresponding one of the received multiplexed wavelengths w_1-w_n from the multiplexer 12 to generate an output signal comprising w_1+f_1 to w_n+f_n. The tunable fiber 14 doesn't involve the use of a spectral response that may be different from that of the multiplexer 12.

Still further, the feedback arrangement of Kim et al. (involving elements 14-19, 21, and 22) does not disclose or suggest a **feedback arrangement comprising one of a group consisting of a reflector coupled to the second port of the feedback transmission filter, and a loop coupled between the second ports of the main and feedback transmission filters** <u>for generating a feedback signal to the output of the at least one laser</u>, as is recited in the last limitation of currently amended claim 1. More particularly, the Kim et al. apparatus does not reflect, or return, any signal back to a second port (bottom port) of the tunable fiber 14, or a loop that is coupled between the second port of the tunable filter 14 (bottom port of the Examiner designated feedback transmission filter), and the second output of the multiplexer (right side port Examiner designated first transmission filter). Additionally, Kim et al. does not

disclose or even suggest that a feedback signal is provided **back to the output of the at least one laser** since Kim et al. only provides a separate control signal **to an input** of each light source 11, and never provides a shifted feedback signal that is **fed back to the output of the multiplexer 12 and then back to the output of each light source 11 for locking each light source.** In light of the above discussion, applicants believe that currently amended independent claim 1 is not anticipated, in the sense of 35 USC § 102, or even made obvious, in the sense of 35 USC § 103, by Kim et al. Claims 2-4, which are dependent on currently amended claim 1, further define and/or limit claim 1 (currently amended), and are thus believed to define over Kim et al., in the sense of 35 USC § 102 and 35 USC § 103.

Currently amended independent claim 7 ha limitations that are similar to those found in currently amended claim 1. Each of the above arguments for currently amended claim 1 over coming Kim et as also apply to currently amended independent claims 7, 8, 51, 60, 67, and 73. Accordingly, it is believed that independent claims 7, 8, 51, 60, 67, and 73, and the claims that are dependent thereon, are not anticipated, in the sense of 35 USC § 102, or even made obvious, in the sense of 35 USC § 103, by Kim et al.

The Examiner has indicated that dependent claims 68 and 74 are rejected by Kim et al. because "second portions are passed through filter 14 having a spectral response that shifts the wavelengths in the opposite direction, and any multiplexed portion is demultiplexed (i.e., the one line is formed into many

are the filters 22) prior to the feeding back." The Kim et al. apparatus does not shift the wavelengths of any signal for locking a light source. Instead, the apparatus only measures the wavelength of an output signal of a light source as found in said second portion, and generates a control signal that indicates such change in wavelength, which is not a shifted feedback signal. Still further, such control signal is applied to an input of the light source, and not fed back to an output of the light source. Additionally, claims 68 and 74 are dependent on independent claims 67 and 73, respectively, which have been shown to distinguish over Kim et al. in the sense of 35 USC § 102 and 35 USC § 103. In light of the above discussion, dependent claims 68 and 74 are not believed to be anticipated, in the sense of 35 USC § 102, or even made obvious, in the sense of 35 USC § 103, by Kim et al.

With regard to the dependent claims 69-70 and 75-76, the Examiner states that "the filters/multiplexers being bidirectional such that the feedback light goes back therethrough (rather than in a loop) like Kim." Applicants traverse the Examiner's concept in that neither one of the Kim et al. Multiplexer 12 or Acousto-optic tunable fiber 14 are disclosed or even suggested as being used in a bidirectional manner so that a feedback signal goes back therethrough to the output of a light source, as was explained hereinbefore. In light of the above discussion, dependent claims 69-70 and 75-76 are not believed to be anticipated, in the sense of 35 USC § 102, or even made obvious, in the sense of 35 USC § 103, by Kim et al..

The Examiner has rejected dependent claim 9 under 35 USC § 103 as being unpatentable over Kim et al. The Examiner states that "Kim discloses the limitations as above, but does not disclose the system as polarization maintaining. However, polarization maintaining fibers are know in the art, and it would have been obvious to one skilled in the art to include them so that polarization may be controlled, as is known." Applicants traverse the Examiner's rejection of claim 9 for the following reasons. Claim 9 is dependent on independent claim 8 and thus further defines and/or limits claim 8. Accordingly claim 9 is believed to not be anticipated, in the sense of 35 USC § 102, or even made obvious, in the sense of 35 USC § 103, by Kim et al. Still further, the Kim et al. apparatus doesn't disclose or even suggest that any of the signals propagating in any section thereof have to be polarization maintained in order to provide an electrical control feedback signal back to the input of each light source. More particularly, there does not appear to be any reason for maintaining the polarization of any signal since Kim et al. only measures the intensity of the generated signal from the light sources and the pilot signals to generate an electrical control feedback signal. In light of the above discussion, claim 9 not believed to be obvious, in the sense of 35 USC § 103, with regard to Kim et al. .

The Examiner has objected to claims 5-6, 10-50, 69-72, and 75-78 as being dependent upon a rejected base claim, but found same would be allowable if rewritten in independent form including all of the limitations of the base claim and any

intervening claims. Claims 5 and 6 are dependent from independent currently amended claim 1, which has been discussed above. Similarly, claims 10-50 are dependent from currently amended independent claim 8 which has been discussed above and is believed to be allowable, claims 69-72 are dependent from currently amended independent claim 67 which has been discussed above and is believed to be allowable, and claims 75-78 are dependent from currently amended independent claim 73 which has been discussed above. Accordingly, since each of independent claims of 1, 8, 67, and 73 are believed to define over Kim et al. it is believed that the claims 5-6, 10-50, 69-72, and 75-78, which are dependent thereon, also define over Kim et al.

Original claims 2-6, 9-33, 36-50, 58-58, 61-66, 68-72, and 75-78, previously amended claims 34, 35, and 59, and currently amended claims 1, 7, 8, 51, 60, 67, 73, and 74 remain in the application and are believed to be in condition for allowance.

In co-pending Patent application No. 10/776,810 (having a same filing date and assignee as the present Patent application), the Examiner made a double patenting rejection in that the claim 7 therein was related to the combination of claims 8, 29, 35, and 36 of the present Patent application No. 10/776,808. Applicants traversed the need for a terminal disclaimer in the co-pending application because it is believed that claim 7 of the co-pending Patent application does not have the structure of present claims 8, 29, 35, and 36 of the present Patent application, and it was premature to require such terminal disclaimer. Applicants, however, provided such terminal disclaimer in the co-pending

Patent application to overcome the possibility of an extension of time being given to the present Patent application because of a condition that may have been caused by the Patent Office, and/or a future possibility of the present assignee of both co-pending Patent applications selling each of the issued Patents to separate entities. Therefore, applicant has attached hereto a similar Terminal Disclaimer in the present application to that provided in the co-pending Patent Application No.: 10/776,810.

In conclusion, applicants have shown that claims 1-78, as same presently exist in the application, are not anticipated, in the sense of 35 USC § 102, or even made obvious, in the sense of 35 USC § 103, by Kim et al. In addition, claims 51-66 have been allowed. Accordingly, present claims 1-78 are believed to now believed to be in condition for allowance, and an early and favorable action to this effect is respectfully requested. If for some reason the Examiner does not believe that the application is now in condition for allowance, and that a further interview or telephone conversation would further the prosecution, the Examiner is requested to contact Applicants' attorney at Area Code (908 464-0248.

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Attached:
Terminal Disclaimer